THE MINERAL INDUSTRY OF

# GERMANY

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The German economy was the world's third largest, after the United States and Japan, and accounted for about one-third of Europe's gross domestic product (GDP). In 2002, the rate of economic growth was slow. The growth rate of real GDP was about 0.5% compared with 1.5% in 2001. Sluggish global demand has been particularly damaging to Germany, which depends heavily on exports for its economic growth. The German economy faced other serious issues that included high unemployment, high outstanding Government debt, increasing share of Government revenues going for debt service payment, high tax rates, continuing transfer payments to eastern Germany, and growing social security costs (U.S. Embassy, Berlin, Germany, 2003).

## Government Policies and Programs

The Government's declared primary objective continued to be seeking ways to stimulate economic growth and employment and to get a grip on rising Government debt. To this end, the Government was pursuing a combination of budget consolidation, growth incentives, and structural reform. Although the Government intervenes in the economy through the provision of subsidies to selected sectors and the ownership of some segments of the economy, competition and free enterprise are promoted as significant segments of Government policy.

## Environmental Issues

The environment in Germany is the responsibility of the Federal Ministry for the Environment, Water Conservation and Nuclear Safety. Falling within its purview is the Federal Environment Agency in Berlin, the Federal Office for Nature Conservation in Bonn, and the Federal Office for Radiation Protection in Salzgitter.

Environmental concerns that relate to mining are addressed under the Federal mining law and its provisions for environmental impact assessments that must be completed before mining can start. The objective of the assessment is to identify and evaluate all environmental consequences of a planned project by taking into account various design options. The environmental evaluation process in Germany presents a risk for the company involved because project approval is not guaranteed even after completion of the assessment, which usually involves considerable time and resources.

In 2000, the German Government introduced the Summer Smog Program to reduce the levels of ground-level ozone. The program included 17 measures to reduce ozone precursor substances, such as nitrous oxide and volatile organic compounds. By 2010, the Government expects to reduce emissions by 40%. This program is in line with the European Union's (EU) National Emission Ceilings for Certain Pollutants (NEC Directive), which came into force in November 2001. The NEC Directive is the EU's strategy to combat acidification of soil and water and the presence of ozone smog at low altitudes (troposphere) by setting national emission ceilings for ammonia, nitrogen oxide, sulfur dioxide, and volatile organic compounds. Germany has become a pioneer in reducing greenhouse gas emissions and in making alternative fuel sources viable. As a result, Germany has become the world's leader in wind energy with an estimated 39% of the world's installed wind energy capacity (U.S. Energy Information Administration, 2003b§[1]).

## Production

Production in the mining and metals industries depended on a variety of factors that included the availability of materials and supply and demand. The easing of the worldwide recession was a positive factor for those industries that depended on exporting their products. The importance of certain sectors of the German mining industry has decreased steadily during the past decade. Employment in mining decreased to 52,000 in 2000 from 130,000 in 1990. The underground mining sector has shrunk significantly in recent years (Mining Journal, 2002a). Notwithstanding the general contraction of the industry, the production levels of certain minerals remain important domestically and on a worldwide scale (table 1). The high costs of production in Germany compared with those of competing foreign producers and the problems caused by trying to balance production between the reunified former German Democratic Republic (GDR) and former Federal Republic of Germany (FRG) helped constrain production. Germany was among the world's leading and most technologically advanced producers of ammonia, cement, chemicals, coal, electronics, iron, machinery, steel, and vehicles. Germany has remained a world leader in the mining equipment manufacturing sector. Selected indices of production are listed in table 2.

[1] References that include a section mark (§) are found in the Internet References Cited section.

## Trade

Germany was one of the world's major trading nations. About one-third of its GDP depended on exports, and, on average, one job in four depended on trade. Trade between Germany and the United States was worth more than $90 billion in 2002; Germany was the United States' leading European trading partner. Outside the EU, the United States and Japan were Germany's major trading partners (U.S. Census Bureau, 2003).

As a major mineral-processing nation, Germany relied mainly on imports to feed the metals-processing industry, which transformed raw materials into products that supplied the manufacturing industry and provided the bulk of the country's exported materials. The nonferrous metallurgical industry provided its raw materials by imports and recycling. Supply of precious metals originated from domestic nonferrous refineries, domestic supply of scrap, and imports of wrought metal and scrap.

## Structure of the Mineral Industry

The structure of the industry in Germany and the principal companies that operated in the production and processing of metals and minerals are listed in table 3. Most of the producing and processing facilities still in operation were small compared with those in the former FRG except for lignite and potash, which were very large operations. The restructuring and privatization of the facilities in the former GDR continued in 2002. Treuhandanstalt (Interest Management Association), which was the state holding company, retained control of a few companies until they were sold or closed.

## Commodity Review

### *Metals*

**Aluminum.**—In 2002, Germany's primary aluminum industry was the largest in the EU, although it was considered to be medium sized when compared with other world producers. VAW Aluminium AG (a subsidiary of E.ON AG) accounted for more than 75% of the country's primary aluminum production. VAW's wholly owned aluminum smelters in Germany and its participating interests in smelters abroad ensured the supply of input metal for the company's downstream fabricating operations.

Norsk Hydro, which was a Norwegian energy, metals, and agricultural group, entered into an agreement to acquire all shares of VAW. If approved by the European Commission, then the buyout would make Norsk the world's third leading light metal producer after Alcoa Inc. of Canada and Alcan Inc. of the United States. Norsk's aluminum activity annual sales after the acquisition was expected to be about €10 billion ($12 billion), and the merged company would employ about 30,000 people (Alunet, 2002§).

**Copper.**—Norddeutsche Affinerie AG (NA) operated the custom smelter and refinery at Hamburg and was the world's fifth leading custom copper smelter with a production capacity of about 500,000 metric tons per year (t/yr) of copper cathode, 320,000 t/yr of copper rod, and 176,000 t/yr of copper billets and cake. NA was Europe's leading copper smelter (Metal Bulletin, 2002b).

NA was hoping to expand overseas with its new technology for the recovery of copper from scrap, which was developed at its subsidiary Hüttenwerke Kayser AG. The technology was basically an improved version of Mt. Isa technology and involved an investment of about €11 million ($13.4 million). The system combines two processing steps in which materials with an average copper content of 30% are treated and produce an intermediate material of 95% purity. Three shaft furnaces and two converters would be replaced with one new aggregate system. The new system improves in particular the recovery of complex materials (Metal Bulletin, 2002a).

**Steel.**—Europe's steel industry may look uneven to some observers, but it is the most consolidated in the world. European steel producers included the Usinor Group [24-million-metric-ton-per-year (Mt/yr) capacity], the Corus Group (22.9-Mt/yr capacity), the Arbed Group (22.4-Mt/yr capacity), the Thyssen Krupp Group (18.9-Mt/yr capacity), and the Riva Group (14-Mt/yr capacity) and accounted for more than 100 Mt/yr of raw steel capacity, which was about one-half of the EU total.

Germany's number two steelmaker was Saltzgitter AG, which was the leading seamless tube and pipe producer in Western Europe. It continued to reap dividends from its purchase of Mannesmannröhren Werk (MRW) in 2001. Among the top international steelmakers in 2002, Saltzgitter went to 16th from 37th. Saltzgitter's crude steel production rose to 8.2 Mt/yr compared with 5.1 Mt/yr in 2001. Mannnesmann's tubes unit helped Saltzgitter to compensate for the slump in steel sales that it shared with most other mills (Metal Bulletin, 2002c).

**Zinc.**—MIM Holdings Ltd. of Australia stated that it no longer regarded its zinc smelting operations in Duisburg, Germany, and Avonmouth, United Kingdom, as part of its core business. MIM announced that subject to regulatory approvals, it would sell the MIM Huttewerke Duisburg GmbH (MHD) lead-zinc smelting and refining complex to Sudamin Investments GmbH. The MHD operations produced 90,000 metric tons (t) of zinc in the 2001-02 financial year; this output represented more than one-third of Germany's zinc production. According to MIM, Sudamin planned to restructure MHD with a view of converting the whole operation to recycled sources of feed. Sudamin would continue to process concentrates from MIM's McArthur River Mine in Australia and to supply crude lead produced at MHD to MIM's lead refinery at Northfleet in the United Kingdom (Mining Journal, 2002b).

Xstrata plc announced it had completed its acquisition of the Nordenham zinc smelter from Metaleurop SA. Consideration was reported to be $100 million; this included $13 million for zinc-related inventories (Mining Journal, 2003).

### *Industrial Minerals*

**Bentonite.**—In terms of overseas developments, Süd-Chemie AG was the leading bentonite producer in Europe. The company controlled or had minority interests in companies in France, Indonesia, Mexico, the Republic of Korea, Turkey, and the United States. Süd-Chemie's main business was in Gammelsdorf, Bavaria, where it produced acid-activated bentonite, calcium, and sodium products (Süd-Chemie AG, 2002§).

**Cement.**—The privatization process launched by Treuhandstalt 11 years ago in East Germany has resulted in a more-fragmented industry and a more-diversified range of companies than in other European countries. In 2002, seven cement producers and three or four importers competed in a market that collapsed by one-third within 5 years. The main reason for the depressed state of the cement market was a 7-year-long recession in the German construction sector (Bulk Materials International, 2002).

**Clays.**—Between 140 and 160 small- to medium-sized clay mines were in operation in 2000 in Germany. About one-half of the high-quality refractory and ceramic clays produced were from the Rhineland-Palatinate area. Production in Bavaria was concentrated in the Oberfalz area.

Germany was one of the leading producers of kaolin in Western Europe. Most of the German kaolin was mined in Bavaria, and Amberger Kaolinwerke GmbH was the leading producer with mines in Hirschau (Quarzwerke, 2002§).

**Graphite.**—Graphitwerk Kropfmühl AG was the only company that mined and processed natural graphite in Germany. The company operated a mine and plant at Kropfmühl, Passau, and a plant at Werk Wedel, Holstein. The amount of production has been decreasing in recent years owing to declining reserves. About one-half of the company's production went into the European refractory industry.

**Gypsum.**—Germany was a major European producer of crude gypsum. Most of the production was from the Lower Saxony area.

**Potash.**—After closings and restructuring, K+S Kali GmbH operated six mines in four potash districts and had a potassium chloride production capacity of 4 Mt/yr; its product grades were 2 Mt/yr of standard grade and 2 Mt/yr of granular grade. Germany was the third leading potash producer in the world after Canada and Russia and met about 13% of worldwide potash needs (K+S Kali GmbH, 2003§).

### *Mineral Fuels*

Germany has relatively insignificant domestic energy sources and must rely on imports to meet its energy needs. In 2002, the most important energy source in Germany's consumption of primary energy was petroleum with a 41% share of total consumption followed by natural gas (23%) and coal (23%). About 11% of electrical generation was supplied by 19 nuclear plants. About 30% of Germany's energy requirements was satisfied from domestic sources; the remaining 70% was imported. By 2020, the share of imports was expected to rise to 80%; oil was still expected to remain the primary energy source. The Government signed an agreement with the utility companies to phase out nuclear power generation by 2021 (U.S. Energy Information Administration, 2003a§).

As domestic production declines, Germany will emerge as a significant coal importer. Gross imports of hard coal, coke, and briquettes have more than doubled since unification in 1995. Germany's largest suppliers included Australia, Canada, Columbia, Poland, and South Africa. German hard coal imports were expected to increase during the next 20 years as nuclear power is phased out and domestic production declines (Alexander's Gas & Oil Connections, 2003a§).

**Coal, Anthracite and Bituminous.**—Coal production was located primarily in the Ruhr and Saar regions. The gradual phase-out of subsidies that have supported Western Europe's coal industry for so long continued. Beginning in 2003, subsidies will be reduced to below their 2001 levels. This was in line with EU policy to eliminate subsidies to industries. Because coal was Germany's only major domestic fuel source, the Government was considering maintaining anthracite and bituminous coal production capacity critical to the country's energy security. The coal industry was also a major employer (Mining Magazine, 2002a).

**Lignite.**—Lignite coal production was mainly in the Rheinish area to the west of Cologne and the Lusatian area near Dresden. Lignite mining was under less economic pressure than hard coal mining.

Germany was the world's largest lignite producer. Lignite-fired powerplants became the second largest supplier of electricity after nuclear energy, which accounted for 33% of the total. Lignite raised their share to 27% (Mining Magazine, 2002b).

**Renewable Energy.**—The wind power sector has continued its strong expansion. Capacity grew by more than one-third in 2002 after more than 2,000 new turbines were installed in a country that is already a world leader in the field. Capacity rose by 37% to 12

gigawatts (GW), and the number of turbines installed rose by 20% to 13,800. As a result, wind power accounted for 4.7% of total energy consumption in 2002 compared with 3% in 2001, and topped the contribution from hydroelectric generation for the first time (Alexander's Gas & Oil Connections, 2003b§).

The Government approved a project to build the second wind-propelled electricity power station in the German North Sea. The project will be located 35 kilometers (km) west of Sylt outside the 12-sea-mile zone and will have a generating capacity of 300 megawatts (MW). The Government was expecting to build wind plants that would account for 500 MW of capacity by 2006 (Alexander's Gas & Oil Connections, 2003c§).

**Uranium.**—The ongoing cleanup of the former Soviet uranium mining operations in the former GDR was viewed as Europe's biggest mine rehabilitation project. When the Wismut Mines were in production, the only goal was to maximize uranium output. This resulted in an environmental problem of monumental proportions. At various sites, 48 waste rock piles contained about 311 million cubic meters of waste material and covered a surface area of about 15 square kilometers ($km^2$). In addition, 14 tailings ponds contained 160 million cubic meters of residues from uranium-ore-processing plants and covered a surface area of 7 $km^2$. The German Government was expected to spend more than $9 billion on this rehabilitation project during the next 10 to 15 years (Engineering and Mining Journal, 1999). Continuing remediation work in 2002 focused on decommissioning facilities and immobilizing contaminated material in a manner that would limit long-term hazards to humans and the environment.

## Infrastructure

Germany had about 640,000 km of highways and roads that ranged from the high-speed autobahn system to undeveloped gravel-and-packed-dirt country roads. Of this total, paved highway totaled more than 500,000 km, and unpaved roads, an estimated 135,000 km. The railroad system included 45,468 km of track, about 90% of which was Government owned. Of this total, 44,769 km was 1.435-meter(m) standard-gauge track, and 699 km was 1.000-m gauge track. Germany had 600 airports. Pipelines included a 97,564-km line for natural gas, a 3,964-km line for refined products, and a 3,644-km line for crude petroleum. Inland waterways and canals totaled 7,541 km and had 31 major ports; the Kiel Canal served as an important connection between the Baltic and the North Seas, and the Rhine-Main-Danube Canal served as a connection between the North and the Black Seas. The major maritime ports were, in descending order of tonnage, Hamburg, Rostock, Bremerhaven, Bremen, and Wihelmshaven and accounted for about 70% of total merchandise traffic (U.S. Central Intelligence Agency, 2002§).

## Outlook

Germany's economy, with a growth rate of close to zero and an unemployment rate hovering around 10.5%, grew more slowly during 2002 compared with 2001 and may be on the verge of stagnation. This could be offset if the economic growth in Germany's international trading partners increases. Industrial production is expected to remain around current levels. Export-led growth has diminished as the global economy has lost momentum (U.S. Commercial Service Germany, 2002§).

To be more efficient, industries, which include mineral-resource industries, may have to be restructured, which may result in increased unemployment that, in turn, would cut into the available resources of the Federal Government in the form of payments for unemployment compensation, retraining, and other social costs. This situation is expected to continue in the short term.

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**Major Sources of Information**

Statistisches Bundesamt [Federal Statistics Office]
Gustav-Stresemann-Ring 11
65180 Wiesbaden, Germany
Bundesanstalt für Geowissenschaften und Rohstoffe [Federal Institute for Geosciences and Natural Resources]
Stilleweg 2, Postfach 51 01 53
30631 Hannover, Germany
Bundesministerium für Forschung und Technologie [Federal Ministry for Research and Technology]
Heinemannstrasse 2
53175 Bonn, Germany
Bundesministerium für Wirtschaft, Abteiling III, Energiepolitik, Mineralische Rohstoffe [Federal Ministry for Economics, Section III, Energy Policy and Mineral Raw Materials]
Villemombler Strasse 76
53100 Bonn-Duisdorf, Germany
Deutsches Institut für Wirtschaftsforschung [German Institute for Economic Research]
Köningen-Luise Strasse 5
14195 Berlin (Dahlem), Germany

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TABLE 1

GERMANY: PRODUCTION OF MINERAL COMMODITIES[1, 2]

(Metric tons unless otherwise specified)

| Commodity | | 1998 | 1999 | 2000 | 2001 | 2002[e] |
|---|---|---|---|---|---|---|
| METALS | | | | | | |
| Aluminum: | | | | | | |
| Alumina, $Al_2O_3$ equivalent: | | | | | | |
| Calcined | | 600 [e] | 583 | 500 [e] | 520 [r] | 550 |
| Hydrate[e] | | 700 | 700 | 652 [r] | 650 [r] | 650 |
| Metal: | | | | | | |
| Primary | | 612,381 | 633,804 | 643,545 | 651,600 | 652,900 [3] |
| Secondary | | 453,328 | 482,658 | 572,257 | 620,300 | 666,148 [3] |
| Total | | 1,065,709 | 1,116,462 | 1,215,802 | 1,271,900 | 1,319,048 [3] |
| Arsenic, white, $Ar_2O_3$ content[e] | | 200 | 200 | 200 | 200 | 200 |
| Cadmium, metal, refinery including secondary | | 1,020 | 1,145 | 458 [r] | 539 [r] | 525 |
| Cobalt, metal, including alloys[e] | | 500 | 500 | 500 | 500 | 500 |
| Copper, metal: | | | | | | |
| Smelter: | | | | | | |
| Primary | | 264,500 [r] | 250,200 [r] | 211,200 [r] | 317,700 [r] | 295,300 [3] |
| Secondary | | 228,300 [r] | 355,600 [r] | 360,400 [r] | 245,200 [r] | 269,900 [3] |
| Total | | 492,800 | 605,800 | 571,600 | 562,900 | 565,200 [3] |
| Refined: | | | | | | |
| Primary | | 274,600 [r] | 242,000 [r] | 245,000 [r] | 352,400 [r] | 330,900 [3] |
| Secondary | | 421,300 [r] | 453,600 [r] | 464,400 [r] | 341,400 [r] | 264,900 [3] |
| Total | | 695,900 | 695,600 | 709,400 | 693,800 | 595,800 [3] |
| Iron and steel: | | | | | | |
| Iron ore concentrate: | | | | | | |
| Gross weight | | 100,000 [e] | -- | -- | -- | -- |
| Fe content | | 14,000 [e] | -- | -- | -- | -- |
| Metal: | | | | | | |
| Pig iron | thousand tons | 30,162 | 27,932 | 30,846 | 29,184 | 29,427 [3] |
| Ferroalloys[e, 4] | do. | 100 | 90 | 80 | 72 | 80 |
| Of which ferrochromium | do. | 21 | 17 | 22 | 19 | 20 |
| Steel, crude | do. | 44,046 | 42,056 | 46,376 | 44,803 [r] | 45,015 [3] |
| Semimanufactures | do. | 36,591 | 35,879 | 38,974 | 37,011 | 38,136 [3] |
| Lead: | | | | | | |
| Smelter | | 100,000 [e] | 160,600 | 170,000 [e] | 155,900 [r] | 141,200 [3] |
| Refined: | | | | | | |
| Primary | | 176,800 | 169,557 | 210,515 | 153,743 | 142,000 |
| Secondary | | 203,400 | 204,000 | 204,000 [e] | 219,640 | 239,000 |
| Total | | 380,200 | 373,557 | 414,515 | 373,383 | 381,000 |
| Platinum-group metals, metal, refined[e] | kilograms | 60,000 | 60,000 | 50,000 | 50,000 | 50,000 |
| Selenium, metal | do. | 100,000 | 100,000 | 100,000 [e] | 100,000 [e] | 100,000 |
| Silver, metal, refined[e] | do. | 500,000 | 500,000 | 500,000 | 500,000 | 400,000 |
| Tin, metal, primary and secondary[e] | | 1,000 | 1,000 | 500 | 100 | 100 |
| Uranium concentrate, $U_3O_8$ content[e] | | 25 | 25 | 28 [3] | 26 | 221 |
| Zinc, metal, including secondary | | 333,968 | 332,852 | 327,500 | 358,300 | 378,600 [3] |
| INDUSTRIAL MINERALS | | | | | | |
| Abrasives:[e] | | | | | | |
| Natural, pumice | | 300,000 | 250,000 | 200,000 | 124,000 [r, 3] | 43,000 [3] |
| Artificial, corundum | | 60,000 | 50,000 | 60,000 | 60,000 | 60,000 |
| Barite, marketable (contained $BaSO_4$) | | 123,300 | 118,500 | 111,800 | 108,100 [r] | 101,000 |
| Boron materials, processed borax[e] | | 1,200 | 1,000 | 1,000 | 1,000 | 1,000 |
| Bromine[e] | | 600 | 500 | 500 | 500 | 500 |
| Cement: | | | | | | |
| Clinker, intended for market[e] | thousand tons | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 |
| Hydraulic | do. | 36,610 | 36,219 | 35,207 | 30,989 | 23,311 [3] |
| Chalk, crude, including ground | do. | 400 | 400 [e] | 1,061 [r] | 1,045 [r] | 1,022 [3] |

See footnotes at end of table.

TABLE 1--Continued
GERMANY: PRODUCTION OF MINERAL COMMODITIES[1, 2]

(Metric tons unless otherwise specified)

| Commodity | | 1998 | 1999 | 2000 | 2001 | 2002[e] |
|---|---|---|---|---|---|---|
| INDUSTRIAL MINERALS--Continued | | | | | | |
| Clays: | | | | | | |
| Bentonite | thousand tons | 509 | 477 | 465 | 448 [r] | 495 [3] |
| Ceramic clay | do. | 5,000 [e] | 3,543 | 4,100 | 5,500 [r] | 4,700 |
| Fire clay[e] | do. | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 |
| Fuller's earth[e] | do. | 600 | 500 | 500 | 500 | 500 |
| Kaolin, marketable | do. | 3,400 | 3,543 | 3,655 | 3,779 [r] | 3,681 [3] |
| Other, including brick clay[e] | do. | 20,000 [3] | 20,000 | 21,000 | 20,000 | 20,000 |
| Diatomite | do. | 54 | 53 | 54 | 50 | 50 |
| Feldspar[e] | | 460,000 | 500,000 | 544,000 | 500,000 | 500,000 |
| Fluorspar: | | | | | | |
| Acid-grade[e] | | 25,000 | 26,800 | 29,600 | 29,400 [r] | 33,400 |
| Metallurgical-grade[e] | | 1,500 | 1,500 | 1,500 | 1,000 [r] | 1,000 |
| Total | | 26,500 [e] | 28,300 | 31,100 | 30,400 [r] | 34,400 |
| Graphite, marketable | | 270 | 300 | 300 [e] | 300 [e] | 300 |
| Gypsum and anhydrite, marketable[e] | thousand tons | 4,000 | 4,600 | 2,300 [r] | 2,000 [r] | 1,800 |
| Lime, quicklime, dead-burned dolomite | do. | 7,000 [e] | 6,440 | 6,850 | 6,630 [r] | 6,620 |
| Magnesium salts, byproduct of potash mining[e] | do. | 1,200 | 1,200 | 1,200 | 1,200 | 1,200 |
| Nitrogen, N content of ammonia | do. | 2,512 | 2,406 | 2,473 | 2,522 | 2,623 [3] |
| Phosphate materials:[e] | | | | | | |
| Phosphatic fertilizers, $P_2O_5$ content | | 700 | 700 | 700 | 700 | 700 |
| Thomas slag: | | | | | | |
| Gross weight | thousand tons | 150 | 150 | 200 | 200 [e] | 200 |
| $P_2O_5$ content | | 19,000 | 19,000 | 20,000 | 20,000 [e] | 20,000 |
| Pigments, mineral, natural[e] | | 4,000 | 4,000 | 4,000 | 3,000 | 2,500 |
| Potash, $K_2O$ content | thousand tons | 3,582 | 3,543 | 3,407 | 3,549 [r] | 3,472 [3] |
| Pumice, marketable[e] | do. | 600 | 500 | 500 | 500 | 500 |
| Salt, marketable: | | | | | | |
| Evaporated | do. | 9,098 | 8,965 | 9,322 | 8,456 [r] | 8,576 [3] |
| Rock and other | | 5,056 | 6,921 | 4,904 | 5,052 [r] | 5,000 |
| Sodium compounds, n.e.s.:[e] | | | | | | |
| Soda ash, manufactured | thousand tons | 1,400 | 1,400 | 1,500 | 1,500 | 1,500 |
| Sulfate, manufactured | do. | 100 | 100 | 100 | 100 | 100 |
| Stone, sand and gravel: | | | | | | |
| Stone: | | | | | | |
| Dimension, crude and partially worked[e] | | 100,000 | 100,000 | 100,000 | 100,000 | 100,000 |
| Dolomite and limestone, industrial | thousand tons | 71,900 | 81,000 | 75,151 [r] | 68,552 [r] | 70,000 |
| Quartz and quartzite[e] | | 25,000 [3] | 25,000 | 25,000 | 25,000 | 25,000 |
| Slate[e] | | 70,000 [3] | 70,000 | 70,000 | 70,000 | 70,000 |
| Sand and gravel: | | | | | | |
| Building sand and gravel | thousand tons | 372,500 | 382,700 | 343,200 | 324,200 [r] | 303,500 [3] |
| Gravel, including terrazzo splits[e] | do. | 200,000 | 200,000 | 200,000 | 200,000 | 200,000 |
| Sand: | | | | | | |
| Foundry | do. | 3,500 | 3,500 | 3,500 [e] | 3,500 [e] | 3,000 |
| Industrial, glass[e] | do. | 10,000 | 10,000 | 8,500 | 8,500 | 8,000 |
| Sulfur, byproduct: | | | | | | |
| Metallurgy[e] | thousand tons | 25 | 504 | 618 | 684 | 754 |
| Natural gas and petroleum | do. | 1,100 [e] | 1,824 | 1,735 [r] | 1,749 [r] | 1,745 [3] |
| Other[e] | do. | 50 | 60 | 100 | 100 | 100 |
| Total | do. | 1,175 | 2,388 | 2,453 [r] | 2,533 [r] | 2,599 [3] |
| Talc and steatite[e] | | 9,000 | 9,000 | 8,000 | 7,000 [r] | 7,000 |
| MINERAL FUELS AND RELATED MATERIALS | | | | | | |
| Asphalt and bitumen, natural[e] | | 10,000 | 9,000 | 10,000 | 10,000 | 10,000 |
| Coal: | | | | | | |
| Anthracite and bituminous, marketable | thousand tons | 40,960 | 43,849 | 33,590 [r] | 27,361 [r] | 26,363 [3] |
| Lignite | do. | 166,035 | 162,242 | 168,051 [r] | 175,364 [r] | 181,778 [3] |

See footnotes at end of table.

TABLE 1--Continued
GERMANY: PRODUCTION OF MINERAL COMMODITIES[1, 2]

(Metric tons unless otherwise specified)

| Commodity | | 1998 | 1999 | 2000 | 2001 | 2002[e] |
|---|---|---|---|---|---|---|
| MINERAL FUELS AND RELATED MATERIALS--Continued | | | | | | |
| Coke: | | | | | | |
| Of anthracite and bituminous coal | thousand tons | 10,277 | 8,568 | 9,115 | 7,289 | 7,226 [3] |
| Of lignite[e] | do. | 175 | 175 | 175 | 173 [r] | 154 [3] |
| Fuel briquets: | | | | | | |
| Of anthracite and bituminous coal | do. | 185 | 174 | 146 [r] | 140 [r, e] | 124 [3] |
| Of lignite, including dust and dried | do. | 2,345 | 2,072 | 1,819 [r] | 1,740 [r] | 1,365 [3] |
| Gas:[e] | | | | | | |
| Manufactured: | | | | | | |
| Blast furnace | million cubic meters | 4,500 | 4,000 | 4,000 | 4,000 | 3,000 |
| Coke oven | do. | 2,500 | 2,000 | 2,000 | 2,000 | 1,000 |
| Total | do. | 7,000 | 6,000 | 6,000 | 6,000 | 4,000 |
| Natural: | | | | | | |
| Gross | do. | 22,000 | 23,000 | 22,000 | 22,000 | 22,000 |
| Marketed | do. | 19,900 [3] | 21,200 [3] | 21,720 [r, 3] | 21,698 [r, 3] | 21,529 [3] |
| Peat: | | | | | | |
| Agricultural use | thousand cubic meters | 9,561 | 9,473 | 9,648 | 9,722 [r] | 9,788 [3] |
| Fuel use[e] | do. | 175,000 [3] | 175,000 | 160,000 | -- [r] | -- [3] |
| Petroleum: | | | | | | |
| Crude | thousand 42-gallon barrels | 21,146 | 19,728 | 22,658 | 23,603 | 27,758 [3] |
| Refinery products: | | | | | | |
| Liquefied petroleum gas | do. | 29,255 | 31,888 | 32,688 | 35,032 [r] | 34,289 [3] |
| Gasoline, including aviation | do. | 223,465 | 228,038 | 229,101 | 293,378 [r] | 308,252 [3] |
| Naphtha | do. | 81,379 | 82,648 | 82,085 | 82,548 [r] | 83,229 [3] |
| Mineral jelly and wax | do. | 1,527 | 1,472 | 1,575 [r] | 1,554 [r] | 1,645 [3] |
| Kerosene and jet fuel | do. | 211,676 | 233,046 [r] | 234,461 [r] | 227,153 [r] | 246,822 [3] |
| Distillate fuel oil | do. | 265,555 | 343,167 | 345,637 | 349,853 [r] | 351,114 [3] |
| Refinery gas | do. | 3,227 | 2,706 | 3,269 | 3,276 [r] | 3,505 [3] |
| Lubricants | do. | 10,787 | 11,298 | 10,556 | 10,675 [r] | 10,737 [3] |
| Nonlubricating oils | do. | 7,867 | 8,197 | 8,100 | 7,197 [r] | 7,348 [3] |
| Residual fuel oil | do. | 14,626 | 17,399 [r] | 15,756 [r] | 16,257 [r] | 12,847 [3] |
| Bitumen and other residues | do. | 16,968 | 22,228 | 22,592 | 19,450 [r] | 21,252 [3] |
| Bituminous mixtures | do. | 1,211 | 1,199 | 1,210 [r] | 1,100 | 1,209 [3] |
| Petroleum coke | do. | 7,539 | 10,428 | 5,819 | 9,328 [r] | 9,031 [3] |
| Unspecified | do. | 18,242 | 16,254 | 11,977 | 9,919 [r] | 10,920 [3] |
| Total | do. | 893,324 | 1,009,968 [r] | 1,004,826 [r] | 1,066,720 [r] | 1,102,200 [3] |

[e]Estimated; estimated data are rounded to no more than three significant digits; may not add to total shown. [r]Revised. -- Zero.
[1]Table includes data available through November 2003.
[2]Data are from a combined Germany.
[3]Reported figure.
[4]Includes speigeleisen, unspecified crude iron, and blast furnace ferromanganese with 2% or more carbon.

TABLE 2
GERMANY: SELECTED INDICES OF PRODUCTION

(1995 = 100)

| Sector | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|
| General | 108.7 | 110.4 | 117.2 | 117.8 | 116.2 |
| Mining | 85.0 | 84.1 | 78.7 | 73.3 | 72.4 |
| Manufacturing | 109.7 | 111.5 | 119.2 | 120.0 | 118.2 |
| Electricity and gas | 104.8 | 105.2 | 106.4 | 106.0 | 106.4 |

Source: United Nations, 2003, Monthly Bulletin of Statistics, v. LVII, no. 984, June, p. 16.

TABLE 3
GERMANY: STRUCTURE OF THE MINERAL INDUSTRY FOR 2002

(Thousand metric tons unless otherwise specified)

| Commodity | | Major operating companies and major equity owners | Location of main facilities | Annual capacity |
|---|---|---|---|---|
| Alumina | | VAW Aluminium AG (E.ON AG) | Plant at Schwandorf (special aluminas) | 430 |
| Do. | | Aluminium Oxid Stade GmbH (VAW, 50%, Dadco Alumina and Chemicals Ltd., 50%) | Plant at Stade | 750 |
| Do. | | Martinswerke GmbH ( Alusuisse, 100%) | Plant at Bergheim (fused alumina) | 350 |
| Aluminum | | VAW Aluminium AG (E.ON AG) | Smelters at Innwerke at Töging, Elbewerke at Stade, Rheinwerke at Neuss, Lippenwerke at Lünen (secondary) | 300 |
| Do. | | Aluminium Essen GmbH | Smelter at Essen-Borbeck | 95 |
| Do. | | Hamburger Aluminium-Werke GmbH (VAW, 33%) | Smelter at Hamburg | 120 |
| Arsenic, metal | tons | Metaleurop Handel GmbH | Plant at Langelsheim | 5 |
| Cement | | 38 companies, the major ones are: | 64 mills (grinding) including: | 59,000 |
| Do. | | Heidelberger Zement AG | Plants at Blaubeuren-Schelklingen, Leimen, Hassmersheim, Burglengenfeld, Kieferssfelden, and others | (9,200) |
| Do. | | Dyckerhoff AG | Plants at Amoneburg, Golheim, Neuwied, Neubeckum, and others | (7,250) |
| Do. | | E. Schwenk, Zementwerke KG | Plants at Allmendingen, Karlstadt, and Mergelstetten | (6,000) |
| Do. | | Anneliese Zementwerke AG | Plants at Ennigerloh-Nord, Ennigerloh-Sud, Geske, and Paderborn | (3,500) |
| Do. | | Zementwerke Deunan GmbH | Plant at Deuna | -3,000 |
| Chalk | | Kreidewerke Rugen GmbH | Quarries on Rugen Island | 500 |
| Coal, anthracite and bituminous | | Four companies: | About 27 mines, including: | 72,500 |
| Do. | | Ruhrkohle AG | 14 mines in Ruhr region | (40,000) |
| Do. | | Saarbergwerke AG | 5 mines in Saar basin | (14,000) |
| Do. | | Preussag Anthrazit GmbH | Mine at Ibbenbüren | (2,500) |
| Copper | | Norddeutsche Affinerie AG (Dresdner Bank AG, 20%; Degussa AG, 10%) | Smelter and refinery, both at Hamburg | 500 |
| | | | | 350 |
| Do. | | Hüttenwerke Kayser AG | Refinery at Lünen | 120 |
| Graphite | tons | Graphitwerk Kropfmühl AG | Mine and plant at Kropfmühl, Passan | 20,000 |
| Do. | do. | do. | Plant at Wedel, Holstein | 8,000 |
| Gypsum | | Gipswerke Dr. Karl Würth GmbH | Mine and plant at Stadtoldendorf, Lower Saxony | 150 |
| Do. | | Gyproc GmbH Banstoff Production & Co. KG | Mines and plant in Lower Saxony | 110 |
| Kaolin | | Kemmlitzer Kaolinwerke GmbH | Mines at Gröppendorf, Oschatz, and Sachsen | 100 |
| Do. | | Do. | Plant at Sachen | 100 |
| Limestone | | Harz Kalk GmbH | Quarries at Bad Kösen, Rubelaand, and Kaltes Tal | 6,000 |
| Lead | | Metaleurop Weser Blei GmbH | Smelter and refinery at Nordenham | 120 |
| Do. | | MIM Huttenwerke Duisberg GmbH (MIM Holdings Ltd., 100%) | QSL smelter at Stolberg | 75 |
| Do. | | do. | Refinery at Duisberg | 120 |
| Do. | | Norddeutsche Affinerie AG | Refinery at Hamburg | 50 |
| Lignite | | Rheinische Braunkohlenwerke AG (RWE Rheinbraun) | Surface mines in Rhenish mining area: Garzweiler, Bergheim, Inden, and Hambach | 105,000 |
| Do. | | Lausitzer Braunkohle AG (LAUBAG) | Surface mines in Lausatian mining area: Jänschwalde/Cottbus-Nord, Welzow-Süd, and Nochten/Reichswalde | 50,000 |
| Natural gas | million cubic meters | Brigitta Erdgas und Erdöl GmbH and Elwerath Erdgas-Erdöl GmbH | Plants at Clenze and Grossenkmeten | 9,500 |
| Do. | do. | Mobil Erdgas-Erdöl GmbH | Plants at Scholen | 4,000 |
| Do. | do. | Other companies | Plants at Duste, Rutenbrock, and others | 2,000 |

TABLE 3--Continued
GERMANY: STRUCTURE OF THE MINERAL INDUSTRY FOR 2002

(Thousand metric tons unless otherwise specified)

| Commodity | | Major operating companies and major equity owners | Location of main facilities | Annual capacity |
|---|---|---|---|---|
| Petroleum: | | | | |
| Crude | thousand 42-gallon barrels | The largest companies were: | 6 areas with about 85 oilfields, including: | 80,000 |
| Do. | do. | Elwerath Erdgas-Erdöl GmbH | West of Ems River | (30,000) |
| Do. | do. | Wintershall AG | Weser-Ems Rivers | (21,000) |
| Do. | do. | Deutsche Texaco AG | Elbe-Weser Rivers | (20,000) |
| Refined | do. | About 25 companies, of which the largest were: | 20 refineries, including: | 2,062,000 |
| Do. | do. | Deutsche Shell AG | Refineries at Godorf, Hamburg, and Grasbrook | (256,000) |
| Do. | do. | Esso AG | Refineries at Karlsruhe and Ingolstadt | (245,000) |
| Do. | do. | Ruhr Oel AG | Refinery at Gelsenkirchen | (215,500) |
| Do. | do. | Erdoel Raffinerie Neustadt GmbH | Refinery at Neustadt-Donau | (145,000) |
| Potash, $K_2O$ content | | K+S Kali GmbH | Mines at Bergmannssegen-Hugo, Niedersachen-Riedel, Salzdetfurth, Sigmundshall, Hattorf, Neuhof-Ellers, and Wintershall | 4,000 |
| Do. | | MDK (Mitteldeutsche Kali und Sondershausen) | 10 mines mostly in the State of Thüringen | 2,500 |
| Salt (rock) | | K+S Kali GmbH | Mines at Bad Friedrichshall-Kochendorf, Braunschweig-Luneburg, Heilbronn, Riedel, Stetten, and Wesel (Borth) | 15,000 |
| Steel | | Major companies including: | About 25 plants, including: | |
| Do. | | Thyssen Krupp Stahl AG | Plants mostly in the Westphalia Region | 21,000 |
| Do. | | Salzgitter AG | Plants at Peine and Salzgitter | 9,000 |
| Do. | | Klöckner-Werke AG | Plants at Bremen and Osnabruck | 4,200 |
| Zinc | | Ruhr-Zink GmbH (Metallgesellschaft AG, 100%) | Refinery at Datteln | 200 |
| Do. | | MIM Huttenwerke Duisberg GmbH (MIM Holdings Ltd., 100%) | Imperial smelter and fire refinery at Duisburg | 100 |
| Do. | | Xstrata plc | Refinery at Nordenham | 130 |